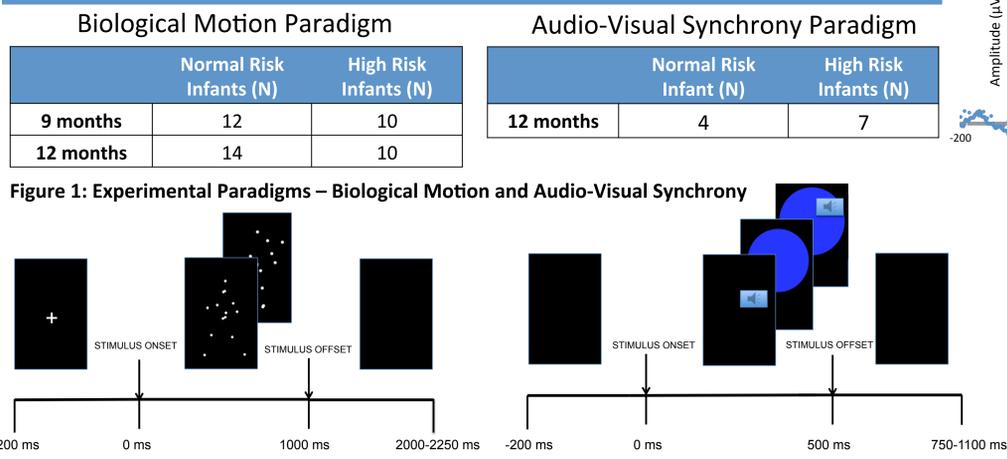


BACKGROUND

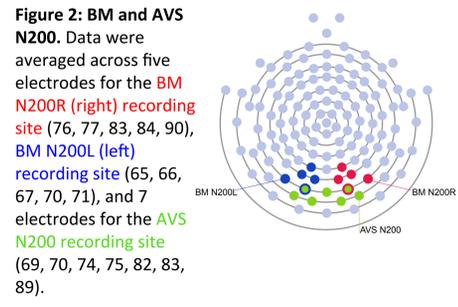
- Biological Motion (BM)**
- Sensitivity to BM emerges within the first two days of life (Simion et al., 2008).
 - By eight months, typically-developing (TD) infants demonstrate adult-like patterns of neural activation to BM (Hirai & Hiraki, 2005).
 - The perception of BM, a precursor for attributing intentions to others, may be atypical in children with autism spectrum disorder (ASD; Klin et al., 2009).
- Audio-Visual Synchrony (AVS)**
- Successful detection of temporal contingency between auditory and visual events is critical for interpreting sensory information.
 - Neural facilitation of multisensory events, indexed by a significantly greater response to multisensory stimuli relative to the summed response across unimodal stimuli, has been consistently observed in TD infants, children, adolescents, and adults in electrophysiological studies (Hyde et al., 2010; Brandwein et al., 2011).
- Current Study**
- Two experiments assessed electrophysiological brain responses to: (1) BM versus scrambled motion (SM) and (2) AVS, in infants from birth to 24 months.
 - Infants with an older sibling diagnosed with ASD were classified as high risk (HR; Ozonoff et al., 2011), whereas infants with no family history of ASD were classified as normal risk (NR).
 - We evaluated the hypotheses that, relative to NR infants, HR infants would display:
 - Atypical social perception (i.e., hyposensitivity to BM)
 - Atypical sensory perception (i.e., weakened neural facilitation to multisensory stimuli)

PARTICIPANTS & METHODS

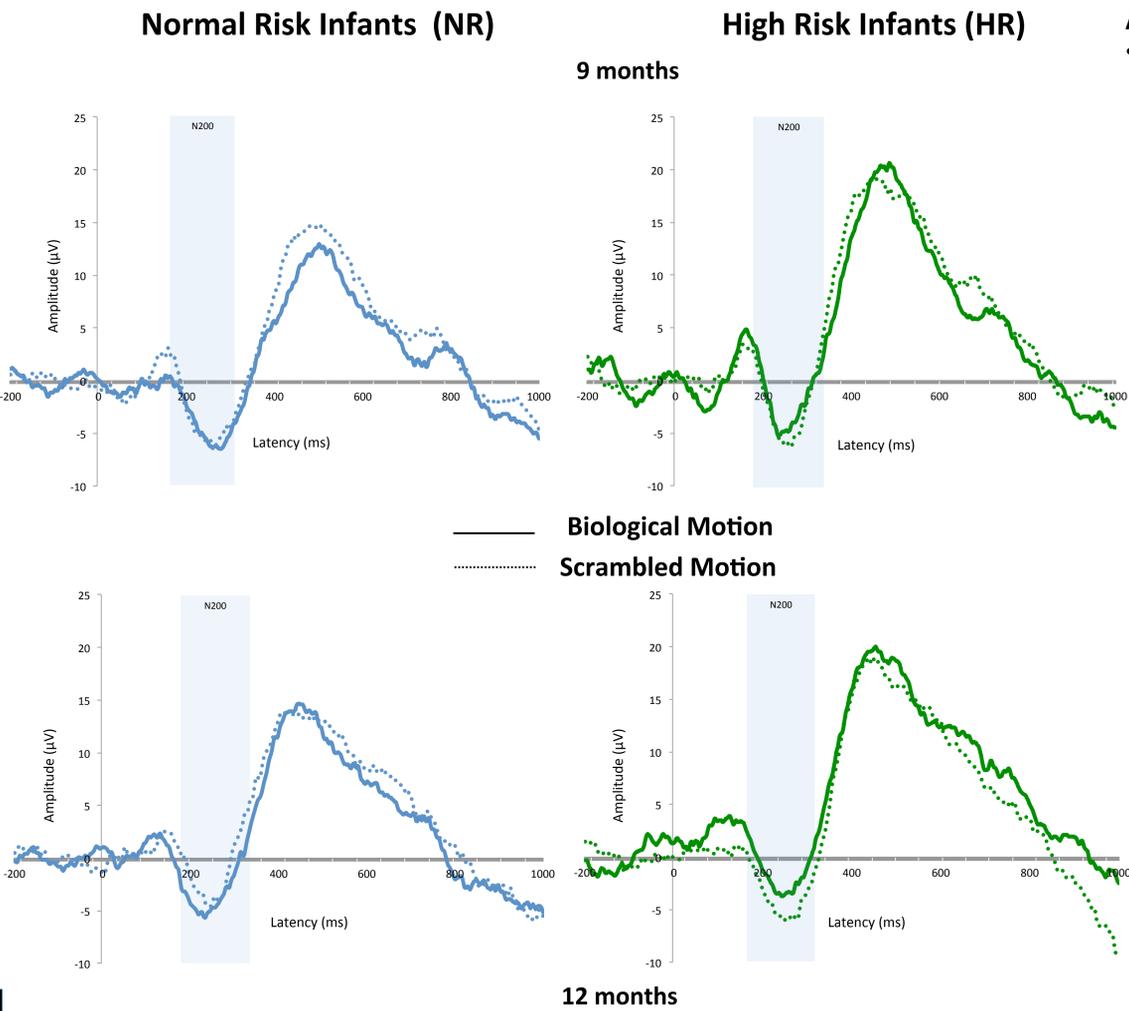


- 100 trials total:
- 25 point-light display walkers moving right
 - 25 point-light display walkers moving left
 - 25 scrambled patterns moving right
 - 25 scrambled patterns moving left
- 90 trials total:
- 30 audio only (tone)
 - 30 visual only (blue circle)
 - 30 audiovisual (tone + blue circle)

- EEG Data Processing and Analysis**
- EEG recorded continuously at 500 Hz using 128-channel Hydrocel Geodesic Sensor nets.
 - ERPs segmented to stimulus onset, hand-edited for artifact, averaged referenced, and baseline corrected.
 - Peak amplitude for the N200 was extracted in the Biological Motion paradigm and the Audio-Visual Synchrony paradigm.
 - Minimum amplitude was analyzed using Repeated Measures ANOVA
 - Between-subjects factor: BM and AVS: Risk (HR/NR)
 - Within-subjects factor(s): BM: Condition (BM/SM) and Hemisphere (LH/RH); AVS: Condition (AVS/SUM)



PRELIMINARY RESULTS



- Figure 3: Grand averaged waveforms of BM and SM for HR and NR infants at 9 and 12 month time points (N200 recording site only).**
- Biological Motion:**
- At 9 and 12 month time points, neither HR nor NR infants demonstrated statistically significant differentiation between BM and SM conditions ($p > .05$).
 - At both time points, NR infants displayed a more negative amplitude to BM relative to SM, indicating increased sensitivity to human movement.
 - HR infants displayed attenuated amplitudes to SM at both time points, indicating hyposensitivity to BM.
 - At 9 months, NR infants demonstrated significant right lateralization in the BM condition, $t(11) = -2.413, p = .034$. In contrast, HR infants demonstrated significant right lateralization for the SM condition, $t(9) = -2.576, p = .030$.

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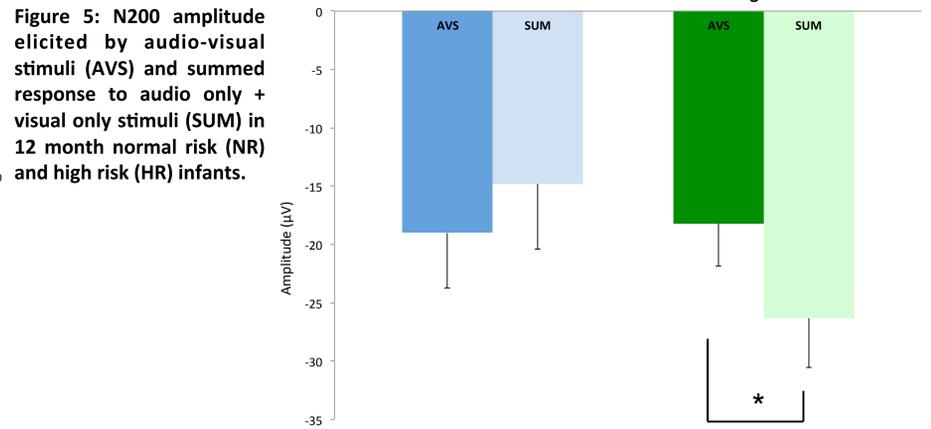
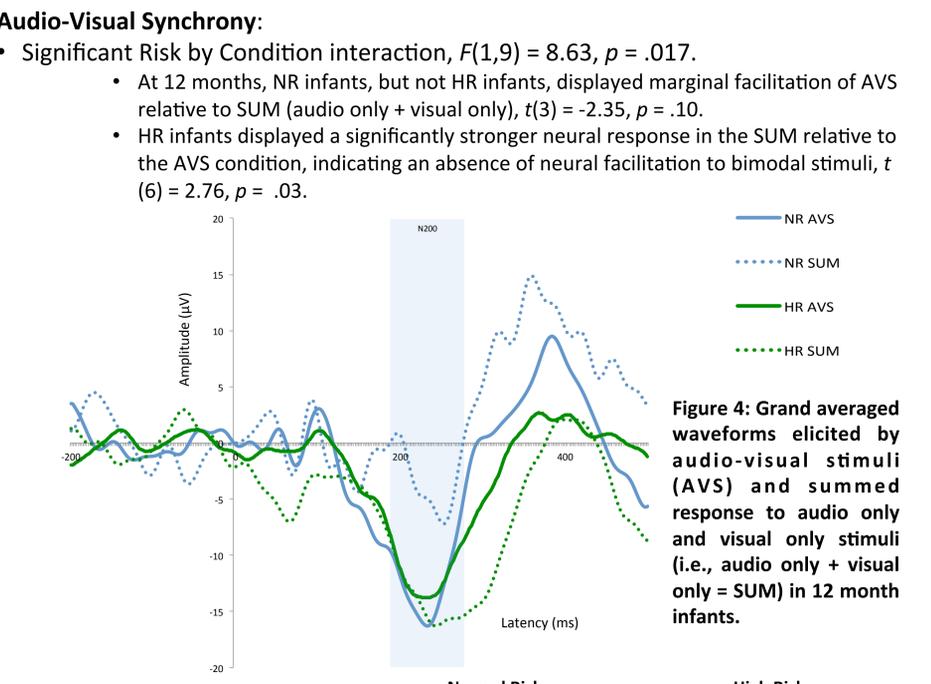
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- CONCLUSIONS**
- Neural response to biological motion in HR infants between 9 and 12 months is comparable to that of NR infants.
 - HR infants may have normative response to BM early in development, with atypical responses to BM emerging later in life.
 - At 12 months of age, HR infants fail to demonstrate neural facilitation of multisensory stimuli.
 - Early course of ASD may be associated with deficits in sensory processing.
 - Atypical neural response in HR infants is task-specific:
 - HR infants evidence intact BM processing during the first year of life but show reduced neural facilitation of multisensory information.

- FUTURE DIRECTIONS**
- Ongoing data collection will follow infants through diagnostic outcomes at 36 months to examine whether HR infants who do and do not develop ASD differ in their response to biological motion and/or audio-visual synchrony prior to the age at which they are diagnosed.
 - Future work will investigate the developmental unfolding of social and sensory perception and how early developmental abnormalities may influence subsequent development.

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